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| 27885 | 7590 | 07/26/2007 | | |
| FAY SHARPE LLP 1100 SUPERIOR AVENUE, SEVENTH FLOOR CLEVELAND, OH 44114 | | | EXAMINER VALENTINE, JAMI M | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/533,822

Applicant(s)

GREEN, MINO

Examiner

Jami M. Valentine, Ph.D.

Art Unit

2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 August 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 August 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>09/05</u> , <u>3/17/06</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status of the Application

1. **Claims 1-8** are pending in this application.

US National Phase of PCT

2. Acknowledgment is made that this application is the US national phase of international application PCT/GB03/04783 filed 5 November 2003 which designated the U.S. and claims benefit of UK 0225779.8, filed 5 November 2002.

Foreign Priority

3. Acknowledgment is made that the certified copy of the foreign priority document has been received in the national stage application from the International Bureau.

Information Disclosure Statement

4. Acknowledgment is made that the information disclosure statement has been received and considered by the examiner. If the applicant is aware of any prior art or any other co-pending applications not already of record, he/she is reminded of his/her duty under 37 CFR 1.56 to disclose the same.

Drawings

5. The drawings are objected to because figures 2, 3, 4, 5 and 6 are informal.

Specifically:

- figures 2a, 2c 3a, and 3c are not properly labeled;
- the reference characters used in figures 2a and 2b are not explained in the specification;

- the reference characters in figure 2a are the same as those of figured 1 and 6 but appear to indicate different elements.
- Figure 4a, 4b, 4c, 5a 5b, 5c and 6 are shaded, have poor contrast and are not suitable for reproduction.

6. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

7. The abstract of the disclosure is objected to because it has too few words. The abstract must contain 50 –150 words. Correction is required. See MPEP § 608.01(b).

8. The use of the trademarks Oxford Plasmalab 80, Merck Selectipurâ, and VMP Perkins Elmer has been noted in this application. These trademarks should be capitalized wherever they appear and be accompanied by the generic terminology.

Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner which might adversely affect their validity as trademarks.

9. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: Claim 3 recites “a wafer-bonded silicon-on-insulator substrate” however, the specification makes no mention of a wafer-bonded silicon-on-insulator substrate.

Claim Rejections - 35 USC § 112

10. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

11. **Claims 3 and 8** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

12. Per **Claim 3**, the following language is indefinite “A silicon anode according to claim 2 made on a wafer-bonded silicon-on-insulator substrate” It is unclear whether the silicon anode (including the silicon substrate of claim 1) is formed on top of a separate wafer-bonded silicon-on-insulator substrate or if the silicon substrate of claim 1 is the wafer-bonded silicon-on-insulator substrate. This claim is deficient because it is imprecise, hence, one of ordinary skill in the art would not be reasonably apprised of the scope of the invention and this claim is rendered indefinite.

13. **Claim 8** recites the limitation "an anode". Claim 8 depends on claim 1, however, claim 1 does not include an anode. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

14. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

15. **Claims 1-2 and 4-5** are rejected under 35 U.S.C. 102(b) as being anticipated by S. Tsuchiya et al., ("Structural Fabrication Using Cesium Chloride Island Arrays as a Resist in a Fluorocarbon Reactive Ion Etching Plasma", Electrochemical Solid-State Letters, Volume 3, issue 1, pp. 44-46, 2000; publicly available electronically November 5, 1999) hereinafter referred to as Tsuchiya.

16. Per **Claim 1** Tsuchiya discloses a device comprising a regular or irregular array of sub-micron silicon structures fabricated on a silicon substrate. (see figure 1E)

17. The recitation "an integrated silicon electrode for a battery" has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

18. Per **Claim 2** Tsuchiya discloses the device of claim 1, including where the sub-micron silicon structures comprise pillars of silicon fabricated on an n-type silicon substrate (Tsuchiya page 44, column 1, first paragraph, discloses where the sub-micron silicon structures comprise pillars of silicon. Tsuchiya page 44, column 1, last paragraph discloses where the silicon substrate is an n-type silicon substrate).

19. Per **Claim 4** Tsuchiya discloses the device of claim 2, including where the silicon pillars do not exceed a fractional coverage of 0.5 of the substrate. (Abstract teaches a packing density of 35)

20. Per **Claim 5** the limitations are "product-by-process" limitations. While product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. In re Hirao, 190 USPQ 15 at 17(footnote 3). The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) See also in re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324; In re Avery, 186 USPQ 116 in re Wertheim, 191 USPQ 90 (209 USPQ 254 does not deal with this issue); and In re Marosi et al, 218 USPQ 289 final product per se which must be determined in a "product by, all of" claim, and not the patentability of the process, and that an old or obvious product, whether claimed in "product by process" claims or not. Note that Applicant has the burden of proof in such cases, as the above case law makes clear.

Claim Rejections - 35 USC § 103

21. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

22. **Claims 3, 6 and 7** are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Tsuchiya.

23. Per **Claim 3**, insofar as definite, the claim is interpreted as follows: a silicon anode according to claim 2 formed on top of a separate wafer-bonded silicon-on-insulator substrate.

Insofar as definite, the claim is rejected in view of the existing prior art as follows: Tsuchiya discloses the device of claim 2 including where the array of sub-micron silicon structures is fabricated on a silicon substrate, but fails to teach where the device is made on a wafer-bonded silicon-on-insulator substrate.

24. It would have been obvious as a matter of design choice to form the device on top of a wafer-bonded silicon-on-insulator substrate since applicant has not disclosed that to do so solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well when formed on top of a different surface.

25. Per **Claims 6 and 7** Tsuchiya discloses the device of claim 2 including where the pillars are 85 ± 20 nm. This is equivalent to a diameter range of 0.065 – 0.105 microns. Further, the height of the pillars in the device of Tsuchiya given by equation [2] on page 45, and overlaps the claimed height range, for the proper conditions.

26. Additionally, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the claimed height and diameter ranges since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. Furthermore, the specification contains no disclosure of either the critical nature of the claimed dimensions of any unexpected results arising therefrom. Where patentability is an aid to be based upon particular chosen dimensions or upon another variable recited in a claim, the Applicant must show that the chosen dimensions are critical. See *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

27. **Claim 8** is rejected under 35 U.S.C. 102(b) as being unpatentable over Tsuchiya in view of Green et al. (US Patent No 6,353,317) hereinafter referred to as Green.

28. Per **Claim 8**, Tsuchiya discloses the device of claim 1, but fails to teach a lithium battery including an anode in accordance with claim 1.

29. Green teaches that it was well known to those of ordinary skill in the art at the time the invention was made to use mesoscopic pillar structures as part of lithium/silicon anodes in batteries. (column 6 lines 49-58)

30. It would have been obvious to one having ordinary skill in the art at the time the invention was made to form a lithium battery including a pillar structures as part of lithium/silicon anodes as taught by Tsuchiya in view of Green since it was known in the art that lithium batteries commonly used silicon pillar structures.

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jami M. Valentine, Ph.D. whose telephone number is (571) 272-9786. The examiner can normally be reached on Mon-Thurs 8:30am-7pm EST. **NOTE:** From June 18 through August 8th, The examiner will be available *only* on Thursdays and Fridays 8:30am-7pm EDT, due to jury duty service.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Parker can be reached on (571) 272-2298. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


KENNETH PARKER
SUPERVISORY PATENT EXAMINER

Jami M Valentine, Ph.D.
Examiner
Art Unit 2815

JMV